511 Deployment Coordination Program
Policy Committee Briefing
Thursday, March 1, 2001

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511 Deployment Coordination Program
Policy Committee Briefing

Ritz Carlton, Pentagon City
Room – Plaza C
1250 S. Hayes Street
Arlington, VA 22202
Thursday, March 1, 2001
11 a.m. – 3 p.m.

Agenda

- 11:00 a.m. – 11:15a.m. Welcome and Introductions, Chairman Elwyn Tinklenberg (AASHTO/Minnesota DOT), Vice Chairman Larry Yermack (ITS America/PB Farradyne), Vice Chairman Greg Cook (APTA/Ann Arbor Transit Authority)

- 11:15 a.m. – 11:35 a.m. Why 511?, Christine Johnson, U.S. DOT **(I)**

- 11:35 a.m. – 11:55 a.m. The FCC Ruling on 511, Bill Jones, U.S. DOT **(I/D)**

- 11:55 a.m. – 12:15 p.m. Policy Committee Views and Aspirations for 511 **(D)**

- 12:15 p.m. – 1:00 p.m. Lunch

- 1:00 p.m. – 1:20 p.m. The 911 Experience, Norm Forshee, National Emergency Number Association/St. Clair County (IL) **(I/D)**

- 1:20 p.m. – 2:20 p.m. Snapshot of Current Telephone Traveler Information Services – Carol Zimmerman, Battelle, Moderator **(I/D)**
  - Statewide Road Reports –Rick Schuman, PBS&J
  - Transit Customer Services – Sandra Davenport, NJ Transit
  - Metropolitan Multi-modal Services – Leon Walden, Kentucky Transportation Cabinet
  - Wireless Carrier Services – Kathryn Condello, Cellular Telecommunications & Internet Association

- 2:20 p.m. – 2:50 p.m. The March 29-30 Retreat **(I/D/A)**
  - Issues to be addressed - Jim Wright, AASHTO/Minnesota DOT
  - Format - Kathy Stein, Howard/Stein-Hudson

- 2:50 p.m. – 3:00 p.m. Wrap Up, Chairman Tinklenberg

I = Information; D = Discussion; A = Action

National 511 Deployment Assistance and Coordination Program Policy Committee

Preliminary Membership List

Elwyn Tinklenberg, Chair
Commissioner
Minnesota Department of Transportation
395 John Ireland Boulevard
Mailstop 100
Saint Paul, Minnesota 55155-1899
PH: 651-296-3000
Commissioner@dot.state.mn.us

Lawrence Yermack, Vice Chair
President
PB Farradyne
322 Tower Oaks Blvd.
Rockville, MD 20852
PH: 301-468-5568
Yermack@pbworld.com

Gregory Cook, Vice Chair
Executive Director
Ann Arbor Transportation Authority
2700 South Industrial Highway
Ann Arbor, MI 48104
PH: 734-677-3902
gcook@theride.org

Frances Banerjee
Los Angeles Department of Transportation
City of Los Angeles
221 N. Figueroa Street
Suite 500
Los Angeles, CA 90012
PH: 213-580-1182
fbanerjee@dot.lacity.org

John Baniak
Executive Director
I-95 Corridor Coalition
77 Belmont Dr.
Sarasota Springs, NY 12866
PH: 518-584-4826 FAX: 518-584-4827
jbaniak@nycap.rr.com

Philip Caruso (representing Steven Gayle, ITE President)
Deputy Executive Director
Institute of Transportation Engineers
1099 14th St. NW
Suite 300-W
Washington, DC 20005-3438
Ph: 202-289-0222
tbrahms@ite.org [until 3/5/01]
pcaruso@ite.org [after 3/5/01]

James Codell
Secretary
Kentucky Transportation Cabinet
State Office Building
501 High Street
Frankfurt, KY 40622
PH: 502-564-4890, FAX: 502-564-9540
Email: jcodell@mail.kytc.state.ky.us

Kathryn Condello
Vice President, Industry Operations
Cellular Telecommunications Industry Association
1250 Connecticut Avenue
Washington, DC 20036
PH: 202-736-3235 FAX: 202-887-1629
Kcondello@ctia.org

Shirley DeLibero
President and CEO
Metropolitan Transit Authority of Harris County
1201 Louisiana
P.O. Box 61429
Houston, TX 77208-1429
PH: 713-739-4832

sdelibero@ridemetro.org

Robert Denaro
Sr Vice President
Rand McNally and Company
8255 N. Central Park
Skokie, IL 60076-2970
PH: 847-329-6712 FAX: 847-329-6361
bdenaro@randmcnally.com

Ann Flemer [Rep. for Steve Heminger]
Metropolitan Transportation Commission
Deputy director of Operations
101 Eight Street
Oakland, CA 94607-4700
Ph: 510-817-3240
Email: aflemer@mtc.ca.gov

Norm Forshee
911 Coordinator
St. Clair County
101 South 1st Street
Belleville, Illinois 62220
Phone - (618) 277-7316
Fax - (618) 277-7668
nforshee911@norcom2000.com

Steven Gayle
Executive Director
Binghamton Metropolitan Transportation Study
PO Box 1766, Government Plaza
44 Hawley St. 5th floor [for express mailings]
Binghamton, NY 13902-1766
Ph: 607-778-2443
sgayle@co.broome.ny.us

Robert Gibbons
Supervisor
Stafford County
PO Box 339
Stafford, VA 22554
(540) 658-8607
(540) 752-1936
rgibbons@co.stafford.va.us

Geoff Halstead
President & CEO
TrafficStation Inc.
800 Wilshire Boulevard
16th Floor
Los Angeles, CA 90017
PH: 213-929-2000 FAX: 213-929-2001
geoff@trafficstation.com

Honorable Chris Hart
County Commissioner
Hillsborough County
601 East Kennedy Blvd
PO Box 1110
Tampa, FL 33601
PH: 813-272-5725 FAX: 813-272-7052
Email: hartc@hillsboroughcounty.org
Laurie: hutchenl@hillsboroughcounty.org

Steve Heminger
Executive Director
Metropolitan Transportation Commission
101 Eighth Street
Oakland, CA 94607-4700
PH: 510-464-7700
Email: sheminger@mtc.ca.gov

George Heinrichs
President
SCC Communications Corp.
6285 S. Lookout Road
Boulder, CO 80301
PH: 303-581-5605 FAX: 303-581-0900
george@sccx.com

Dave Hensing
President
ITS America
400 Virginia Avenue SW
Washington, DC 20036
PH: 202-484-2890 FAX: 202-484-3483
Dhensing@itsa.org

Bob Hopkins
Managing Director of Administration

American Automobile Association
1000 AAA Drive
Heathrow, FL 32746
PH: 407-444-7660 FAX: 407-444-7380
rhopkins@national.aaa.com

John Horsley
Executive Director
AASHTO
444 N. Capitol Street NW
Washington, DC 20001
PH: 202624-5800 FAX: 202-624-5808
jhorsley@aashto.org

Henry Hungerbeeler
Director
Missouri Department of Transportation
105 West Capitol Avenue
P. O. Box 270
Jefferson City, Missouri 65102
PH: 573-751-4622, Fax: 573-526-5419
Email: hungeh@mail.modot.state.mo.us

David Jannetta
Executive Vice President
Traffic.com
951 Duportail Road, Suite 220
Wayne, PA 19087
Ph: 610-407-7410 Fax: 610-725-0847
djannetta@traffic.com

Christine Johnson
Director, ITS Joint Program Office
Federal Highway Administration
400 7th Street, SW, Room 3401
Washington, DC 20590
PH: 202-366-0408 FAX: 202-366-3302
Christine.johnson@fhwa.dot.gov

Karen Lamb
Director, Customer Services
Washington Metropolitan Area Transit Authority
8405 Colesville Road, 5th Floor
Silver Spring, Maryland 20910
PH: 301-562-4690 FAX: 301-562-4675
Email: klamb@wmata.com

Norbert Lucash
Director, Technical Operations
United States Telecom Association
1401 H Street NW #600
Washington, DC 20005-2164
PH: 202-326-7297
Email: nlucash@usta.org

William Millar
President
American Public Transit Association
1201 New York Avenue
Washington, DC
PH: 202-898-4070
wmillar@apta.com

Jeff Paniati
Program Manager, ITS Joint Program Office
Federal Highway Administration
400 7th Street, SW, Room 3401
Washington, DC 20590
PH: 202-366-9536 FAX: 202-366-3302
Jeff.paniati@fhwa.dot.gov

Mary Peters
Director
Arizona Department of Transportation
206 S. 17th Street
Phoenix, AZ 85007
PH: 602-712-7227
Email:

John D. Porcari
Secretary
Maryland Department of Transportation
10 Elm Road
P. O. Box 8755
BWI Airport, MD 21240-0755
PH: 410-865-1000, Fax: 410-865-1334
Email: jporcari@mdot.state.md.us

Edward Thomas
Associate Administrator for Research, Demonstration and Innovation, TRI-1

Federal Transit Administration
400 Seventh Street, S.W.
Room 9401
Washington, DC 20590
Ph: 202-366-4052, Fax: 202-366-3765
Email: edward.thomas@fta.dot.gov

Harry Voccola
Senior Vice President
Navigation technologies
97 McCutchen Court
Middletown, NJ 07748
PH: 908-804-5495 FAX: 732-671-4349
voccola@navtech.com

Tom Warne
Executive Director
Chief Administrative Officer
Utah Department of Transportation
4501 S. 2700 West
Salt Lake City, Utah 84119
PH: 801-965-4027
Twarne@dot.state.ut.us

James Weinstein
Commissioner
New Jersey Department of
Transportation
1035 Parkway Ave.
Trenton, NJ 08625
PH: 609-530-3536, Fax: 609-530-3894
Email: jamesweinstein@dot.state.nj.us

Contributors to this Packet:

Since January 12, 2001, the 511 Working Group has been developing materials to support the work of the 511 Policy Committee. As is evident from the list of contributors to the papers in this packet, a diverse and talented array of resources have created the material provided to you today. Jim Wright of Minnesota DOT/AASHTO is responsible for the packet overall.

511 Overview Paper: Ray Ruggieri, Transcom, Bob Rupert, FHWA, Rick Schuman, PBS&J

511: A Summary of the FCC's Report and Order: Bill Jones, U.S. DOT, Craig Roberts, PBS&J

The "Other N11's": How are They Provided?: David Fierro and Patrick Shortal, SmartRoute Systems, Joseph Schuerger, PBS&J

What do Users Want from a 511 service?: Jane Lappin, EG&G, Melanie Crotty, MTC, Patty Babal, Navigation Technologies, Pete Costello, ITS America

Wireline Telecommunications Industry Overview: James Pol, U.S. DOT, Rose Breidenbaugh and Norbert Lucash, USTA, Rick Schuman, PBS&J

Wireless Telecommunications Industry Overview: James Pol, U.S. DOT, Kathryn Condello, CTIA, Rick Schuman, PBS&J

Call Routing and its Implications: Leon Walden, Kentucky Transportation Cabinet, James Pol, U.S. DOT, Kevin Palmer, PBS&J

Telecommunications Laws and Regulations: Todd Kell, Virginia DOT, Mark Johnson, Squires, Sanders & Dempsey, Pete Costello, ITS America

Patents: Todd Kell, Virginia DOT, Jerry Strigari, NJ Transit, Mark Johnson, Squires, Sanders & Dempsey, Pete Costello, ITS America

Computer Telephony Terms and Technologies: Leon Walden, Kentucky Transportation Cabinet, James Pol, U.S. DOT, Kevin Palmer, PBS&J

Scan of Existing Telephone Traveler Information Services: Carol Zimmerman, Battelle, Pierre Pretorius, Kimley-Horn, Scott Perley, Traffic.com, Mohammed Hadi, PBS&J

Arizona Case Study: Tim Wolfe, Arizona DOT, Bill Jones and James Pol, U.S. DOT, Bob Rupert, FHWA, Rick Schuman, PBS&J

Kentucky Case Study: Leon Walden, Kentucky Transportation Cabinet, Bill Jones and James Pol, U.S. DOT, Bob Rupert, FHWA, Rick Schuman, PBS&J

Detroit, MI Case Study: Louis Lambert, Michigan DOT, David Fierro and Patrick Shortal, SmartRoute Systems

Minnesota Case Study: Steve Bahler, Minnesota DOT

San Francisco Bay Area Case Study: Melanie Crotty and Emily Van Wagner, MTC, Les Jacobson, PB Farradyne, Martin Mattes, NGKE, Rick Schuman, PBS&J

Utah Case Study: Bryan Chamberlin, Utah DOT

511 OVERVIEW

Background

On March 8, 1999, The U.S. Department of Transportation (USDOT) petitioned the Federal Communications Commission (FCC) to designate a nationwide three-digit telephone number for traveler information. This petition was formally supported by 17 State DOTs, 32 transit operators, and 23 Metropolitan Planning Organizations and local agencies. On July 21, 2000 the FCC designated 511 as the national traveler information number.

Key Points

- We asked for 511
- We got 511 with few strings attached
- State and local agencies responsible for implementation
- FCC encourages national use and consistency of service
- FCC will review our progress in 5 years

The FCC ruling leaves nearly all implementation issues and schedules to state and local agencies and telecommunications carriers. There are no Federal requirements and no mandated way to pay for 511; however, USDOT and FCC expect to see some type of nationwide deployment. In 2005, the FCC will review progress in implementing 511.

While the flexibility provided in the FCC ruling is highly desirable, it also presents a challenge. There is a great deal of interest in using 511 throughout the U.S. It is expected that there will be multiple requests for 511, at least in some parts of the U.S., from DOTs, transit agencies, regional and local transportation agencies, as well as private service providers who will offer to implement 511 services for some sort of compensation. If not thoughtfully planned, 511 services could devolve into an inconsistent set of services widely varying in type, quality and cost.

511 Deployment Coordination Program

Mindful of both the opportunity and challenge 511 presents, the American Association of State Highway and Transportation Officials (AASHTO), in conjunction with many other organizations including the American Public Transit Association (APTA) and the Intelligent Transportation Society of America (ITS America), with support from the U.S. Department of Transportation, has established a 511 Deployment Coordination Program.

Key Points

- AASHTO led effort
- Many organizations involved, including APTA, ITS America and U.S. DOT
- Major issues of 511 service content, consistency and cost
- Policy Committee Retreat key for issue resolution and direction setting

The goal of the 511 Deployment Coordination Program is **"the timely establishment of a national 511 traveler information service that is sustainable and provides value to users."** The intent is to implement 511 nationally using a bottom up approach facilitated by information sharing and a cooperative dialogue through the national associations

represented on the Policy Committee, the governing body of the program. The mission of the Policy Committee is to provide guidance on how to achieve this goal.

A Working Group of practitioners has been formed to support the Policy Committee. In advance of Policy Committee deliberations, the Working Group has identified three major issues that need to be addressed:

- ***Content*** -- Should there be some minimal level of content and quality of that content?
- ***Consistency*** -- To what extent should there be some level of consistency among 511 services throughout the U.S.?
- ***Cost*** -- Should 511 be free to the end user? If so, how should 511 be financed?

These issues will be the cornerstones of the March 29-30 Policy Committee Retreat. The Working Group is currently completing short papers on each of these issues to provide some background and analysis, and make some recommendations to provoke discussion within the Policy Committee. It is hoped that the Policy Committee can reach consensus on some implementation guidelines that you would champion within your respective agency, company or organization, and your association(s). Further, you will be asked to consider organizational roles, responsibilities and functions moving forward to support collective, coordinated action to achieve the directions established during the Retreat.

To support Policy Committee deliberations, the Working Group is also developing short background papers on certain subjects that relate to the issues to be resolved. Some of these papers will be provided at the March 1 briefing, others will be provided in advance of the March 29-30 retreat.

511 Deployment Coordination Program
Policy Committee Retreat

Westin Innisbrook Resort
36750 U.S. Highway 19 North,
Palm Harbor, Florida 34884
Phone: (727) 942-2000

March 29-30, 2001

Preliminary Agenda

Thursday, March 29

- 8:00 a.m. – 9:00 a.m. Continental Breakfast
- 9:00 a.m. – 9:15 a.m. ***Welcome and Introductions***, Chairman Tinklenberg, Vice Chairman Yermack, Vice Chairman Cook
- 9:15 a.m. – 9:35 a.m. 511 Program Overview, Jim Wright *(I/D)*
- 9:35 a.m. – 9:55 a.m. What might 511 rollout look like?, Steve Kuciemba *(I/D)*
- 9:55 a.m. – 10:15 a.m. What do users want from 511?, Larry Yermack *(I/D)*
- 10:15 a.m. – 10:30 a.m. ***"Content" Issues Overview*** *(I)*
- 10:30 a.m. – 10:45 a.m. Break
- 10:45 a.m. – 12:00 p.m. ***Facilitated Session on "Content"*** *(D/A)*
- 12:00 p.m. – 1:15 p.m. Lunch
- 1:15 p.m. – 2:45 p.m. ***"Consistency" Issues Overview and Facilitated Session*** *(I/D/A)*
- 2:45 p.m. – 3:00 p.m. Break
- 3:00 p.m. – 4:45 p.m. ***"Cost" Issues Overview and Facilitated Session*** *(I/D/A)*
- 4:45 p.m. – 5:00 p.m. Summary/Wrap-up of day, Jim Wright
- 6:30 p.m. – 9:00 p.m. Reception and Dinner (Speaker: Bob Denaro, Rand McNally – "The Impact of Innovation on 511")

Friday, March 30

- 7:45 a.m. – 8:30 a.m. Continental Breakfast
- 8:30 a.m. – 10:00 a.m. ***Future Roles, Responsibilities and Functions Issues Overview and Facilitated Session*** *(I/D/A)*
- 10:00 a.m.– 10:15 a.m. Break
- 10:15 a.m. – 11:30 a.m. ***Summary, Consensus and Next Steps*** *(D/A)*
- 11:30 a.m. – 11:45 a.m. Closing Observations from Organizing Sponsors, Chairman Tinklenberg, Vice Chairman Yermack, Vice Chairman Cook, Christine Johnson (I)
- 11:45 a.m. – 12:00 p.m. Retreat Adjourns

I = Information; D = Discussion; A = Action
Dress is Business Casual

511: A Summary of the FCC's Report and Order

The U.S. Department of Transportation's petition to establish a national three digit dialing code for traveler information was granted by the Federal Communications Commission on July 21, 2000 in a Report and Order[1], which assigned 511 as an abbreviated dialing code for travel information services.

The FCC's order makes seven specific points in the assignment of 511. They are:

1. 511 is assigned to government entities for both wireline and wireless telephone services.
2. Technical details of implementation and cost recovery are left with Federal, State, and Local transportation agencies to determine.
3. Federal, State, and Local transportation agencies are to determine the type of information to be provided.
4. Federal, State, and Local transportation agencies are encouraged to ensure that 511 transcends municipal boundaries and is appropriate to the national designation of the number.
5. Transportation agencies are encouraged to determine uniform standards for providing information to the public.
6. U.S. DOT is encouraged to facilitate ubiquitous deployment of 511.
7. The FCC will assess the deployment of 511 in 2005 to determine if the number is in widespread use.

The FCC order very deliberately allows broad discretion on the part of State and local transportation agencies in the implementation of 511. However, the FCC also makes it clear that the 511 number will belong to public agencies, not the private sector. Thus, a private provider of traveler information cannot obtain direct use of the 511 number. This means that State and local governments can use the private sector to provide the service, but only under the auspices of the public entities. In addition, the public agencies are responsible to determine the type of information that will be provided by 511.

Paying for the 511 services is left to the State and local agencies to determine. This is not a mandated public service. Therefore, the telecommunications companies are entitled to recover their costs, and State and local agencies could charge the public for these calls.

The assignment of 511 is nationwide and the FCC expects that the service will be available to the entire traveling public. However, the Commission realizes that this nationwide deployment will take time. The FCC uses the term "national scope" in discussing 511, while many in the transportation community interpret "national" to mean "federal". This is not the intent of the FCC. The U.S. DOT has been encouraged to facilitate deployment; not mandate it nor regulate it. Thus, the U.S. DOT is providing support to this coordination activity, and has announced the 511 conversion program to

[1] Third Report and Order on Reconsideration, CC Docket No. 92-105; Federal Communications Commission; Adopted, July 21, 2000; Released, July 31, 2000.

assist in the conversion of existing traveler information systems using seven or ten digit telephone numbers..

The FCC encourages "uniform standards" for the implementation of 511 to the benefit of the traveling public. Again, the FCC did not imply that it was necessary to have "standards" sanctioned by a national Standards Development Organization, such as the IEEE or AASHTO. The term was meant to encourage a degree of uniformity to make the 511 service easy to use by the public as they travel across the country.

Finally, the FCC will look at the deployment of 511 in 2005 to determine if there is widespread deployment of 511. The three digit dialing codes, 211 through 911, are scarce resources. Thus, if the number is not being used the FCC could reassign the number to another use. However, there are no reporting requirements on 511 deployment inferred in this statement. The U.S. DOT will keep the FCC informed about the status of deployment to satisfy this requirement of the FCC.

The Other N11s: How Are They Provided?

Overview

This paper will overview the other abbreviated dialing codes services and describe their purpose, methods of operation, funding, and historical evolution.

Service Listing Summary

- 211 – Assigned for community information and referral services.
- 311 – Assigned nationwide non-emergency police and other government services.
- 411 – Unassigned, but used virtually nationwide by carriers for directory assistance.
- 511 – Assigned for traffic and transportation information.
- 611 – Unassigned, but used broadly by Local Exchange Carriers (LEC) for repair service.
- 711 – Assigned nationwide for access to Telecom Relay Services (TRS) for individuals who are deaf, hard of hearing, or have speech disabilities and voice users.
- 811 – Unassigned, but used broadly by LECs for business office use.
- 911 – Assigned as the universal emergency telephone number.

How is it done?

Three Digit Dialing Services are designed with efficiency and reliability in mind. Here's how the service works:

- A three-digit N11 code is assigned for use to a "subscriber" in a specific local calling area.
- The subscriber obtains/secures/designates a 7 or 10 digit local number to route the calls made to the three-digit number.
- All switches within the basic local calling area are programmed to translate the three-digit code to the designated point-to number.
- A caller dials the three-digit code associated with a subscriber's information service and/or customer service organization.
- The switch recognizes the three-digit code as an abbreviated dialing string, deletes the three-digits from the dialing string and translates them into the 7 or 10 digit "point-to" number.
- The switch routes the call to the 7 or 10 digit point-to number.
- The N11 subscriber pays for the calls that are routed to the "point-to" number.
- If a subscriber chooses to charge callers for accessing their information, the carrier can record and rate the call for the subscriber via a billing and collection agreement.

Three Digit Dialing Costing Elements

- Service Establishment fee - this is a one-time setup cost based upon population size of calling area.
- Usage Charges – a monthly recurring cost based upon quantity of calls placed to the three-digit code. In several states, a minimum monthly usage charge applies after the initial six months the service has been activated.
- Change of "point-to" number.
- Billing arrangement change - revisions in amounts charged to end-users, change in recording and rating, etc.
- Detailed monthly reports - amount of detail, frequency. May or may not be included as part of the usage charges.

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N11 SUMMARY DATA

N11	USAGE	EXTENT OF USE	HOW PAID FOR	LESSONS FOR 511
211	Access to organizations providing community information and referral services.	Larger cities in CT, GA, LA, TN, AL, MS, NC, OH, and UT are currently implementing.	Donations to agencies and grants.	• Multilingual capability needs to be built into the system. • An Interactive Voice Response (IVR) capability can be utilized to support automatic referrals during peak call volume. • Use of Web sites to augment services offered. • Service levels need to be agreed upon prior to start-up – more staff or equipment may be required if the service wishes to maintain a low abandonment rate (i.e., hang-up) and low average speeds of answering (i.e., time caller is waiting) • Potential for balkanization of services, different uses in different regions
311	Access to City or County government services (including non-emergency police). Calls answered by operators and forwarded to appropriate agency.	Larger cities in TX, AZ, IL, CA, MD, MI, NY use this service.	Funded by providers.	• Monitoring the level and quality of service provided to customers. • Quality review process in place. • Priority and urgency of response is determined by documented policies and procedures. • Establishment of a formal training program for operators.
411	Directory Assistance	Local phone companies, long-distance carriers and many independent providers provide this service.	Costs passed back to users.	• Multiple service providers may use multiple databases. This can result in inconsistencies in finding numbers, services, or data. Provisioning for services should be uniform within a market area, region, and ultimately within the entire state area. • A customer service (i.e., directory assistance) needs to be simple and provide value. With competition among directory assistance services the result has been the quality of service remains essentially the same, yet costs are escalating.
711	Access to nationwide Telecom Relay Services (TRS) for individuals who are deaf, hard of hearing, or have speech disabilities.	DE, HI, MD, ME, MA, NH, NY, PA, RI, VT, DC and WV provide this service.	Costs funded by carriers.	• Lessons are similar to those found for 211/311 services.
911	Universal emergency telephone number. Connects to Public Safety Answering Point (PSAP)	Widely utilized nationally, though some communities are still using 7 or 10 digit dialing to access emergency services.	Surcharge on customer phone bill.	• Provisioning should be uniform with market area. • Level of service and quality of service continually monitored. • Development of contingency plans by PSAPs can ensure continuity of service. • Priority and urgency of response is determined by documented polices and procedures. • Formal initial and refresher training ensures consistent quality of service.

Bringing 511 to Market: What do Users Want?

There are few examples of research in the public domain on consumers accessing traveler information via phone. This paper briefly identifies what is known about advanced traveler information service (ATIS) customer preferences from recent ATIS field test and deployment evaluations. From these studies on ATIS in general, you may infer that a 511 consumer will have similar needs and wants. For the purposes of this paper, ATIS is confined to real-time traffic and transit system data, excluding (1) other modes of travel, (2) static auto route guidance, and (3) recreational information.

Who is the customer?

- ATIS customers are primarily drivers, between the ages of 25 and 55, who commute to work by car. Drivers' interest in ATIS increases with education, income, congestion level, arrival time flexibility, and alternative route availability.
- More detailed market segmentation data for ATIS customers are available from the USDOT Metropolitan Model Deployment Initiative ATIS Customer Satisfaction Evaluation. This study segments ATIS customers according to values, attitudes, and life-stage.
- It is difficult to differentiate ATIS telephone customers from ATIS customers overall because most ATIS customers will use any convenient communications medium depending on context, availability, and service quality. However, some ATIS customers will use only phones. Informed judgment suggests that telephone customers (by comparison to all customers) include lower economic strata, less education, older travelers, and more who are unemployed. The aforementioned group uses the phone because they do not have access to the Internet or mobile phone and/or they have not incorporated new technology into their life; where as, commuters who value their time will access traffic information via their mobile phones.
- There are too few ATIS transit customer evaluations to generalize about the ATIS transit customer. Seattle data suggests that ATIS transit customers are employed, somewhat younger than average transit riders, of average income (relative to transit customers), and have limited access to a car.
- Research findings suggest that rural ATIS customers are:
  - Long-distance drivers with need for road condition information,
  - Tourists with need for road condition information, route guidance, and interest in recreational information, and
  - Local residents with need for road condition information or paratransit services.

How do customers use ATIS?

- Most drivers use ATIS to assess traffic delays, and sometimes change their route or time of departure accordingly. Very few change modes with the information.
- Traffic phone customers most frequently consult ATIS services via mobile phone during their commute to or from work.

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- Traffic customers consult ATIS more frequently than transit customers, with the average users in Seattle consulting as often as once a workday. Transit customers consult ATIS much less frequently, partly because most remote-access data are not real-time.
- Transit riders use of ATIS depends on the content, quality, and location of the service. They use static information for trip planning. Real-time information on platforms enables en-route planning, effective use of waiting time, and notification to others of arrival time. Real-time information by phone or web enables better-timed departures and shorter overall trips.
- Research findings suggest that travelers in rural areas would use road condition information and make route changes as needed.

What benefits does ATIS provide to customers?

- Traffic customers report that ATIS saves time, enables them to avoid congestion, reduces stress associated with uncertainty, and increases safety.
- Transit customers report that ATIS saves them time, helps with route selection, reduces the uncertainty of waiting (when the service is real-time), and increases their satisfaction with the decision to take transit.

What level of service do ATIS customers demand?

- Traffic customers want quick, simple, and safe access to accurate, timely, reliable traffic information. They want coverage of highways and major arterials, identification and description of incidents, direct measures of speed for each highway segment, and travel time between origin and destination.
- Weather conditions are useful where they affect traffic conditions, and especially in regions like Seattle and San Francisco where microclimates can produce startlingly different weather conditions in neighboring regions.
- Predictive information is considered useful.
- Demand for route guidance varies with the customers' level of familiarity with local traffic patterns, alternative routes, and gender, with tourists, unfamiliar drivers, and women having most interest in the service.
- ATIS transit customers want information that reduces trip time uncertainty: real-time information, convenient and distributed access, and good quality interfaces.
- For static information, transit customers want current fares, transit schedules and routes, transfer locations and times, detailed maps, and bus stop locations.
- ATIS transit customers also want point-to-point itineraries for both transit and multimodal trips, and recommended routes and times for fastest travel to their destination.

What are the known obstacles to broad ATIS adoption?

- Experience suggests that the largest obstacle to greater ATIS use is lack of awareness. Survey data indicates few members of the general public are aware of ATIS availability. Because ATIS use requires a behavioral shift, sustained advertising is required.
- In general, drivers do not believe that traffic information will help them. This obstacle can be addressed with good marketing, as an advertising campaign would highlight the benefits of ATIS.
- Data quality and coverage figures prominently in travelers' willingness to use ATIS. Regardless of fees, ATIS access costs travelers time. And in the absence of information of sufficient quality to make the time worthwhile, potential ATIS customers will continue to rely on their own judgment when making travel decisions.
- It is possible that there is no demand for traffic ATIS outside of a limited number of highly congested regions. Data suggest that traffic congestion and constrained alternative route options are prerequisites for ATIS traffic consumer demand.

Conclusions, missing data and other observations:

- Conclusive human factors research establishing the safest methods for communicating ATIS to drivers is needed.
- While limited in scope, the data from transit riders who use ATIS appears sufficient as a base for service development.
- There is insufficient data on the question of how traveler information can influence mode split. If 511 is intended to influence mode split as a strategy for improving traveler mobility, then further research is required.
- There is no data in the public domain on customer response to or demand for a multi-modal information service that integrates auto, transit, intercity rail and bus, and air.
- There is no evaluation data on how to effectively market and advertise ATIS.

Wireline Telecommunications Carrier Industry Overview

This paper provides an overview of the wireline carriers that will be an essential part of 511 service provision. Wireline industry landscape, business motivations and their possible impact on 511 service provision will be addressed. Wireline and landline are used interchangeably in the industry and in this paper.

Market Segments – The traditional, landline telephone companies are widely varying in size, focus and motivation. The major segments of the industry are:

- *Local Exchange Carriers (LECs)* – these companies carry traffic within an FCC defined "local access and transport area" (LATA). While occuring in some areas as early as 1983, the Telecommunications Act of 1996 aimed at creating competition within local areas on a national basis.

  - *Incumbent Local Exchange Carriers (ILECs)* – the original monopoly carriers in each LATA. There are essentially two types of ILECs:
    - large carriers such as Verizon, SBC, Qwest, and BellSouth that have evolved from the original "Baby Bells"
    - smaller regional companies or cooperatives

    Generally, each state will have many ILECs, with one or two having most of the subscribers.
  - *Competitive Local Exchange Carriers (CLECs)* – carriers that compete with ILECs by either reselling the ILECs capacity or building their own facilities to serve customers. While hundreds of companies are either providing or planning to provide competitive local phone service, the major players are long distance carriers, cable companies, and resellers. Internet-based carriers, such as Net2Phone, also provide competitive local service in some cases.

- *Long Distance Carriers* – defined as Interexchange carriers (IXCs), these companies are authorized by the FCC to provide interstate communications services and by a state to provide inter-LATA services within a state. Major long distance carriers are AT&T, MCI and Sprint. Competitors to the major carriers include companies that offer "10-10-xxx" access or pre-paid phone cards, Internet-based carriers, such as IXTC, that use the internet to route calls, and in increasing numbers, ILECs that have had their local areas deemed to be competitive by state regulators.

- *Pay Phone Carriers* – Though down 15% in the past three years, there are roughly 1.9 million pay phones in the United States. Roughly 75% of those phones are operated by the major ILECs. The rest are operated by roughly 2000 different companies. The Telecommunications Act of 1996 deregulated the cost of using a payphone and sought to encourage competition. However, the expansion in wireless phone usage has led to a decline in the number of pay phones and their usage.

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Market Trends – Several major trends are occurring in the wireline phone business:

- Consolidation of major ILECS – major mergers of recent years has left just 4 major ILECs.

- Competition for local service – regulators are encouraging competitors to the ILECs. While it has been slow to emerge, CLECs are beginning to have success, particularly serving businesses. More competition than exists today can be expected.

- ILECS want to offer long distance to their customers – to do so, they must show state regulators that viable local service competition exists in their area, thus ILECs are in essence promoting the establishment of CLECs.

- Carriers are making huge capital investments in broadband technology and converting to internet-protocol based equipment and technology, occupying significant resources and, in many cases, debt. This investment overload has carriers looking to reduce, or offset, capital investment costs in any way possible.

- ILECs that operate under regulatory controls are obligated to make a modest profit on each service they offer – they cannot cross subsidize services.

Implications to 511 – Wireline carriers are in the process of revolutionary changes in all aspects of their business, which will make 511 deployment a challenge:

- 511 is a relatively minor issue to most carriers when compared to other "problems" and "opportunities" – getting their interest will be a challenge.

- ILECs will desire a consistent approach to 511 across their service area, which could span 10-15 states.

- Can expect to see more LECs with market share being diffused; means we will have to work with more carriers to deploy 511.

- The underlying cost structure of telecommunications is changing dramatically. The cost structure of today may be reduced significantly in the near future, which could make 511 service provision more affordable.

Wireline Carrier Trends Implications on 511:

- 511 a minor issue to carriers
- Major carriers will desire consistent approach across operating areas
- Greater carrier competition likely means more carriers to coordination with
- Cost structure of carriers is changing dramatically, possibly for the better

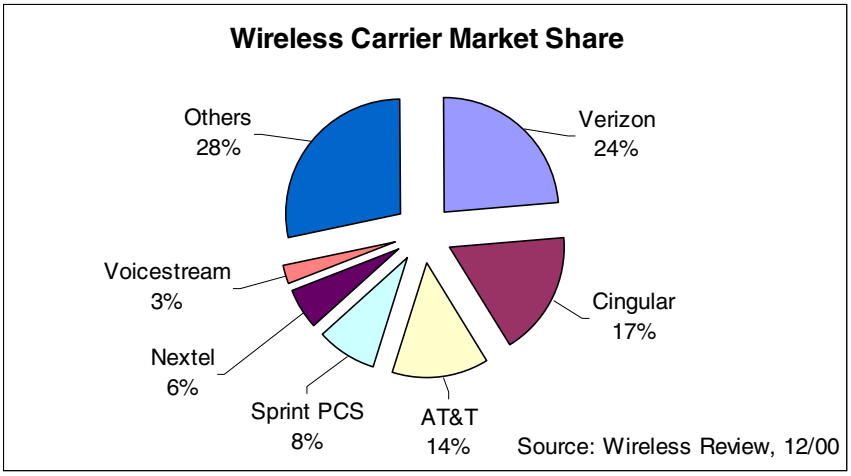
Wireless Telecommunications Carrier Industry Overview

This paper provides an overview of the wireless carriers that will be an essential part of 511 service provision. Industry landscape, business motivations and their possible impact on 511 service provision are addressed.

Conceived in the 1940s and first introduced in 1983, wireless carriers today have roughly 110 million subscribers and nearly $50 billion in revenues in the United States. There can be up to nine wireless carriers operating in each market, in either the 800 MHz or 1800 MHz band.

Market Segments – There are three carrier segments: National, Regional and Small/Rural.

- *National Carriers* – Six wireless carriers offer their services across a nationwide footprint (each is available to over 190 million people). These six carriers serve approximately 80 million subscribers or, 72% of the market. Verizon, Cingular and Voicestream are all products of mergers in the past year.



- *Regional Carriers* – These carriers are typically associated with an incumbent local exchange carrier, as each ILEC was granted one of the original operating licenses in its service area. Examples include ALLTEL, Qwest Wireless, Cincinnati Bell Wireless, and Century-Tel Wireless. They typically have good market penetration in their service areas, but they can only offer a national service footprint through affiliate or roaming arrangements with other carriers. These arrangements are common.

- *Small/Rural Carriers* – Many of these carriers provide wireless services in small town or rural areas. These carriers are key roaming partners to many of the larger national and regional carriers. Many national or regional customer products (i.e., voice mail, data services, etc) are provided by these smaller carriers to preserve consistency with their larger roaming partners' services and features.

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Market Trends and Issues – Several issues and trends are expected to continue in the wireless industry:

- *Consolidation*: Wireless carriers will continue increase their geographic footprint through mergers and acquisitions.
- *Flat rate plans*: The increasing popularity of flat rate, all-in-one calling plans should continue to grow.
- *Reduce churn*: Carriers will continue to seek methods to keep their customers from switching carriers for a better deal. Customer-tailored information services are considered one method to increase customer loyalty.
- *Continued pricing pressure*: With the effective price per minute charged to consumers continuing to drop, the number of wireless customers will continue to grow at significant levels. Thus carriers will seek to provide the network infrastructure at significantly lower incremental costs than delivered previously. Converting their networks to more efficient digital formats is one means of doing this.
- *Maintain or increase monthly bills*: With the effective price/minute and flat rate plans charged to the consumer continuing to drop, carriers are struggling to keep the revenue from each customer from eroding. The average phone bill was $80 in 1990, $40 in 1999, and increased to $45 in 2000. As a result, carriers will continue to find ways to increase the customer usage through new and different incremental services.
- *Internet/Data*: As Carriers increasingly convert their networks to digital formats, internet and other data services are being added to their service portfolio. Some offer these services for an additional fee, others include them in their monthly plans.
- *Capital investment requirements*: Continuing support of federal mandates (E911, 711, Local Number Portability), digital conversion activities, network capacity and build out activities, in addition to Merger/Acquisitions are placing significant demands on carriers for capital investment.

Implications to 511 – The most significant implications are in two areas:

- Carriers view information services as an opportunity for value-added service to increase revenue or reduce churn. Traveler information services are already provided by the six national carriers to their customers, and these services have been tailored for their network, their devices and their customer base. As more wireless devices become internet accessible, these services will increasingly be location-based and customizable by the customer. Generic 511 services will be treated by carriers as just another voice call.

- Increased geographic presence by the wireless carriers will increase the desire for a consistent implementation and cost-recovery model for 511 services. A consistent DOT interconnection and cost recovery model will be helpful in expediting the delivery of wireless 511 calls to the designated service provider.

Wireless Carrier Trends Implications on 511:

- 511: A competitive service? Or just another call?
- Pressure for 511 implementation consistency across boundaries

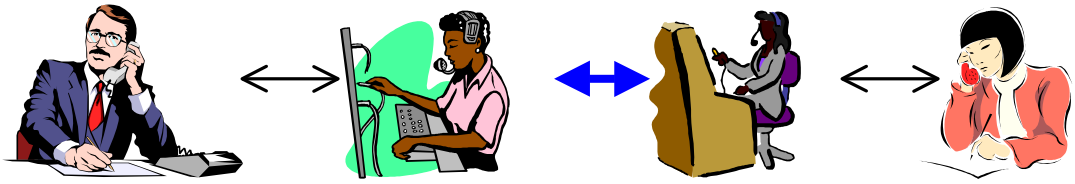
Call Routing and its Implications for 511

This paper describes landline and wireless call routing (or switching) and discuss the possible ramifications as they relate to 511. Call routing in North America typically relies on an architecture that supports call establishment, billing, routing, and information exchange functions of the public switched telephone network. This architecture is very robust and provides a complete call routing platform. The routing infrastructure has undergone a significant upgrade over the past ten years resulting in added value, flexibility, and reduced costs associated with call routing. 511 calls can be routed within the existing framework in much the same manner as existing three digit calls. The right to revenue associated with three digit calls often includes more than one exchange carrier. These costs must be absorbed by the agency receiving the call, the exchange carrier, or by the call originator.

Landline Call Routing

When a call is originated within a home or business using a wireline or landline telephone, a complex routing process is initiated. The routing process revolves around the central office (CO), a facility operated by the telephone company providing service to the customer. Central offices are the core building blocks of the public switched telephone network (PSTN). Numerous central offices form a larger network wherein calls are routed.

Trunks provide signal paths between central offices. When a call is placed that requires routing outside of the central office where it originated, a trunk line is used to establish the link to the destination central office. Figure A depicts a typical call routing scenario wherein a call is routed from an originating central office to a destination central office via a trunk. Trunks can be viewed as a shared resource, in that the ports within trunks are used on an as needed basis. The figure below depicts a typical routing scenario within a small city. When calls are routed within larger cities, states, or multi-state areas, the routing process involves more switches to facilitate the transfer of information between the originating CO and the destination CO.



Call Originator *Central Office A* *Central Office B* *Call Destination*

When a call is placed using the standard seven and ten-digit dialing format (i.e. 555-1212 or 850-555-1212), extensive databases within the routing architecture are utilized to determine the destination of the call. When three digit calls are placed, the databases recognize the use of a three-digit number and translate the three-digit call to a standard ten-digit number. The translated number is used to route the call to the appropriate destination. This explains how a 911 call placed in Chicago has a different destination than the same call placed in New York. **Each central office has the ability to route three digit calls to different destinations.** These databases, in conjunction with databases associated with the routing architecture, must be updated frequently to maintain a properly operating telephone network. The respective telephone companies are responsible for maintaining the databases associated with call routing.

When a landline call is placed, caller identification information is transmitted to the destination. This provides the number of the call originator as well as location information when a properly configured answering device is used. 511 systems could utilize this information to tailor 511 information for the specific geographic area of call origination. The respective telephone companies are responsible for maintaining the databases associated with call routing. Enhanced 911 systems currently deployed across the country have paved the way for this information service.

Wireless Call Routing

Wireless call routing involves an added step, but in many ways resembles the landline call routing process. When a wireless call is initiated by a mobile user, the call is routed to a tower location where a mobile telephone switching office (similar to the landline central office) accepts the call and initiates the routing process. The mobile telephone switching office utilizes a landline connection to the public switched telephone network to route the call to its destination. The process is slightly more complicated when a wireless call is intended for another wireless phone; however, this instance does not relate to 511 services and is not discussed here.

As wireless telephone users leave the geographic area established by their provider and make a call, the user is said to be roaming. The geographic areas vary according to the provider and the service plan selected by the user. The associated charges incurred when roaming also vary according to the provider and service plan. Increasingly, statewide and national wireless calling plans are being introduced, reducing (but not eliminating) the amount of roaming that occurs.

When wireless calls are placed, the location of the mobile user is often difficult to determine. Significant advances have occurred in recent years resulting in the deployment of technology capable of pinpointing a wireless user's location. This issue is of concern to 511 when caller location information is utilized to format the information provided to the caller. One solution to this problem is the assignment of cell sites (towers) to a specific transportation information answering point. By complying with Federal Communications Commission rules for wireless enhanced 911, Phase I, wireless systems have this capability in place for 911 calls. This routing capability may be transferable to 511.

511 Issues

When an organization begins the process of establishing a three-digit presence in a given area, it is recommended that the organization ***establish contact with their respective state telephone associations and public service commissions***. These groups can provide valuable insight into the negotiation of tariffs and associated agreements with the various landline and wireless telephone companies. In multi-state areas, the issues regarding call routing and the associated tariffs become more complex. Many multi-state areas have established organizations within the industry that address telecommunications issues affecting the multi-state area.

Pay phones are often relied upon by the traveling public. Pay phones networks are often operated by competitive local exchange carriers. Negotiations with these carriers, especially those that operate pay phones located at rest areas, should illustrate the benefits they derive from supporting 511. ***The number of pay phone operators is a real issue for 511 call routing.***

When three digit calls are placed that require routing outside of the caller's local calling area, the associated long distance charges must be borne by the caller, call recipient, or the telephone company. ***The issue of long distance calls and their associated cost should be addressed*** by any agency deploying a 511 system.

A similar situation exists when wireless telephone users initiate 511 calls while ***roaming***. The typical wireless user will be less likely to utilize a 511 service if they incur additional cost by making the call. Studies have shown that information service calls from wireless subscribers often result in one or two follow on calls. Wireless providers may waive airtime and roaming charges associated with 511 if they realize the potential for additional calls.

As public agencies begin the process of deploying 511 services, ***careful planning relative to call routing and the associated tariffs, agreements, and cost is vital***. Recent advances relative to the routing of 911 emergency calls will prove helpful when deploying 511 systems, particularly with regard to caller location.

Legislative and Regulatory Issues

This paper on telecommunications legal and regulatory issues affecting 511 implementation presents an initial description of several topics of research and analysis currently under investigation. The topics discussed below are not an exhaustive list of all relevant issues. Any conclusions or recommendations outlined in this document are only preliminary and are subject to revision upon further review.

Telecommunications

FCC's 511 Order. The FCC's July 2000 Order provides significant flexibility for transportation agencies and their partners to determine if, and how, 511 traveler information services are to be deployed. While, on the one hand, the lack of regulatory strictures may be liberating, it also fails to answer several basic questions that all implementers will necessarily confront. For example, transportation agencies will each need to determine how to pay for these services: few, if any, carriers will complete 511 calls at no charge. There is also the cost of collecting and aggregating the traffic data into a form accessible by the public. Moreover, in many states and areas 511 is already in use for other purposes. While these incumbents must vacate the number, the FCC order does not specify the procedures for them to do so. Transportation agencies will request 511 from the carriers. Then, the parties must negotiate as to the terms and conditions by which the carriers will complete 511 calls. The carriers must also perform the necessary network switches, among other technical changes, to route 511 calls, and for which they may insist on compensation. The only role for state PUCs contemplated by the Commission is to ensure that the carriers respond in a reasonable manner to requests for the 511 code. However, some states' laws may give their PUCs additional authority. The FCC Order does not preempt any such requirements.

Specific Telecommunications Issues. A threshold question is whether providers, both public transportation agencies and their private partners, of 511 traveler information services would be considered "telecommunications carriers" under federal and state regulatory regimes. Being judged as a telecommunications carrier would implicate several additional regulatory burdens, such as universal service, carrier interconnection, nondiscriminatory network and service access, number portability, etc. These and other requirements could impose, for example, significant changes in the system architecture for the provisioning of 511 services, thus likely increasing costs and delaying deployment. Individual states may impose additional requirements. Our initial conclusion is that 511 service providers would likely not be categorized as telecommunications carriers under federal or state regulatory regimes.

Similarly, wireless network operators are required to deploy location-identification technologies in order to locate wireless phones when 911 is dialed for emergency assistance (otherwise known as "Enhanced 911"). If 511 service providers were not characterized as telecommunications carriers, this mandate would be inapplicable. Nonetheless, these Enhanced 911 requirements will likely impact how 511 traveler information services are themselves deployed: the ability to locate a wireless phone may enable the provision of more precise and dynamic traveler information.

Another significant issue is incumbent use of the 511 code. In the absence of a national assignment of any three-digit code, the FCC has allowed states and individual carriers to make available unassigned codes for a variety of public and private services. For example, in the Atlanta area callers can currently dial 511 to access to get local, national and international news and information. The FCC's 511 Order did not specify the procedures for acquiring the code from incumbent users except to mandate that sponsoring carrier(s) ensure that such non-conforming use cease upon the code being requested for traveler information services. When in 1997 it allocated 311 for non-emergency police access, the FCC provided a six-month window for incumbents to relinquish the code. The 311 experience should prove to be a valuable precedent for 511 service providers on this and other issues.

A third major topic centers on relations between 511 service providers and telecommunications carriers. 511 calls cannot be completed without carriers – Regional Bell Operating Companies, Incumbent Local Exchange Carriers, new Competitive Local Exchange Carriers, wireless network providers, etc. – routing callers to the appropriate 511 information source in a particular region or area. The 511 Order provides that transportation agencies request the code from these carriers, but the FCC specifically declined to prescribe the terms by which the carriers are to complete the calls. Different carriers will have different technical requirements as well as different interests when responding to the request for the code. For example, an Incumbent Local Exchange Carrier may view the 511 service as a mandate and technical burden; thus motivating it to maximize possible monetary returns for completing these calls or actually making the switches. (However, initial research indicates that the necessary physical switching in existing local exchange networks to route 511 calls should be neither unprecedented nor cost prohibitive, at least for smaller networks.) Wireless carriers, in contrast, may view the 511 traveler information service as a competitive enhancement, thus motivating them to seek revenue associated with the service from their subscriber base rather than from the requesting transportation agencies. These and other interests will affect the approach and terms 511 service providers should adopt upon requesting 511 from carriers.

While we believe that 511 service providers would not be characterized as "telecommunications carriers" for federal or state regulatory purposes, the requirements of individual state Public Service or Utility Commissions ("state PUCs") may also affect how 511 is implemented. According to the 511 Order, the only stated role for these entities is to ensure that carriers respond in an expeditious manner to requests for the code. However, the FCC Order did not preempt other requirements that state PUCs may impose. For example, before a request for the code can be made to a carrier, a state PUC may first have to allocate 511 on a statewide basis for traveler information services. Agency procedure may mandate a lengthy review and hearings. Moreover, carriers may be required to provide 511 through an approved tariff rather than simply negotiating a contract with the requesting transportation agency.

Intellectual Property and Patents

This paper on intellectual property issues affecting 511 implementation presents an initial description of several topics of research and analysis currently under investigation. The topics discussed below are not an exhaustive list of all relevant issues. Any conclusions or recommendations outlined in this document are only preliminary and are subject to revision upon further review.

Business Method Patents. To date, three patents have been identified for services, systems or processes that appear similar to those contemplated being offered through the 511 code. These patents are not for specific physical items, but for processes or systems characterized as Business Method Patents. It is possible – and, in at least one instance, has already occurred – that holders of these patents may claim that certain 511 deployments infringe their rights. Public and private entities faced with these claims may be forced to pay licensing fees, alter their services or, at worst, stop their deployments altogether. Thus, it is important that those deploying 511 traveler information services be made aware of such patents and how to defend against potential infringement claims.

Section 101 of Title 35 of the United States Code defines the subject matter which may receive patent protection: "any new and useful process, machined, manufacture, or composition of matter, or any new and useful improvement thereof." Since at least 1972, the US Supreme Court has struggled with the question of whether computer-related inventions are patentable, finding initially for the negative. In 1981, the Court found that the mere incorporation of an equation, program or computer into a claim does not render it unpatentable. The claims should be viewed as a whole during the subject matter patentability inquiry under Section 101.

The patentability of Business Method Patents was first articulated by the Federal Circuit in State Street Bank & Trust Co. v. Signature Financial Group, Inc., 149 F.3d 1368 (Fed. Cir. 1998), cert. denied, 119 S. Ct. 851 (1999). The Federal Circuit established a new test to determine whether computer-related inventions are patentable: claims reciting a series of mathematical calculations performed by a machine to produce a useful, concrete, and tangible result define patentable subject matter. Thus, under the State Street ruling, business methods implemented on a computer are now patentable as long as the method is novel and non-obvious. The decision reversed earlier precedent that specifically held that business methods were generally not patentable. In AT&T Corp. v. Excel Communications, Inc., 172 F.3d 1352 (Fed. Cir. 1999), the Federal Circuit affirmed the rule pronounced in State Street, stating that an invention employing a mathematical algorithm is not invalid when the algorithm is applied in a useful way.

The State Street holding, and the resulting rush seeking patents for business methods, has engendered significant criticism. Many critics have argued that the US Patent & Trademark Office was too quick in granting such patents. On March 29, 2000, the USPTO announced an action plan to enhance the quality of the examination process for business method patent applications.

State Immunity from Patent Infringement Claims The US Constitution's Eleventh Amendment and the related doctrine of sovereign immunity generally bar any patent infringement suit in

federal courts against a state, state agency, or state officer. Each state is a sovereign entity in the federal system, and it is inherent in the nature of sovereignty not to be amendable to a suit brought by a private interest without the state's consent. In fact, in 1999 the Supreme Court struck down as unconstitutional a federal statute that had abolished state immunity from federal court patent infringement suits. Any such claims against a state would have to proceed, if at all, the Supreme Court held, in accordance with state law. In Florida, for example, aggrieved parties may pursue a legislative remedy through a claims bill for payment in full, or judicially through a takings or conversion claim. Other states may set forth different mechanisms and remedies for these claims.

In contrast, a city, county or other political subdivision of a state is liable for any infringement of a patent arising from its activities. The Eleventh Amendment and the related doctrine of sovereign immunity of states do not extend to such entities.

Specific Business Method Patents As noted above, three existing Business Method Patents have been identified that appear to contemplate systems and services similar to those to be offered through the 511 code. The patents are, in order of their grant date:

- Patent No. 4,812,843 (granted March 1989 to C. Paul Champion, et al.) for "Telephone Accessible Information System," whereby a subscriber receives continuously updated information by way of a telephone, PC and/or personal paging device.
- Patent No. 5,214,689 (granted May 1993 to Next General Information, Inc.) for "Interactive Transit Information Systems," whereby a telephone caller interacts with the system by using a Dual Tone Multi-Frequency (DTMF) type telephone and hears instruction/information over the telephone in response to keypad entries on the telephone.
- Patent No. 5,959,577 (granted September 1999 to Rodric C. Fan, et al.) for "Method and Structure for Distribution of Travel Information Using Network," whereby a system processes position and travel-related information through a data processing station on a data network.

Each patent contains one or more "independent" claims that also include within themselves one or more discrete elements. Generally speaking, if any particular 511 implementation for traveler information services does not include any specific independent claim or one or more elements within such a claim, then the 511 system as implemented would not infringe an existing patent.

We have been informed that, in 1993, patent infringement claims were made against New Jersey Transit by the holder of Patent No. 5,214,689, Next General Information, Inc. ("NGI"), arising from the installation of an interactive schedule information system available by telephone for New Jersey Transit riders. NGI, which had bid on the system installation, actually referred to the New Jersey Transit project in its patent application. New Jersey Transit, along with the winning bidder for the project, negotiated a one-time licensing fee of $35,000 payable to NGI, split between New Jersey Transit and its project contractor. The fee entitles New Jersey Transit to a perpetual, non-exclusive license to make, sell and/or use an interactive information system having an unlimited number of ports solely for use by the agency. It also entitles New Jersey Transit to any subsequent US patents issued to or acquired by NGI for improvements to the patent. NGI may have alleged, and settled, similar claims against other rail and transit agencies.

Computer Telephony Terms and Technologies

This paper defines key technologies, concepts and terms in the telecommunications and computer-based telephony field that relate to 511. The terms have been separated into three categories: Core wireline/landline terms, wireless core terms, and computer telephony terms.

Core Wireline/Landline Terms

Tariffs: published rates, specifications, and service conditions for an offered communications service; states general obligations of both the carrier and customer; tariffs do not have the force of law and may be found unlawful by the courts (depending on the state)

Incumbent Local Exchange Carrier (ILEC): traditional local telephone companies that, prior to deregulation of the telephone industry, had the exclusive right and responsibility to provide local telephone service; ILEC delineates these service providers from the new competitive providers (CLECs)

Competitive Local Exchange Carrier (CLEC): after deregulation, companies that traditionally had the exclusive, franchised right and responsibility to provide local transmission and switching services were joined by new companies that are free to offer comparable services; local exchange carriers (LEC) were born and traditional telcos became known as ILECs (incumbent LECs), while new, independent data and voice telecommunication services companies became known as CLECS

Regional Bell Operating Company (RBOC): remnants of the dismantled AT&T / Bell system; created as a result of the antitrust trial; originally there were seven RBOCs; seven RBOCs were created in 1984, through mergers four presently remain: SBC, Verizon, Qwest, and BellSouth

Central Office (CO): a building owned by the telephone company where calls are routed to their destination via a complex framework of additional central offices and other equipment; the first stop when a call is placed

***Loop*:** medium, usually copper wire, which connects a telephone to the central office

Trunk: path for information transfer between central offices

Port: an interface of a computer, telephone system, or network device where signals may be supplied, extracted, or observed

Private Branch Exchange (PBX): a telephone system within an organization's premises that switches calls between internal users on internal lines while allowing all users to share a certain number of external telephone lines; typically used in a business/office location

Public Switched Telephone Network (PSTN): facilities and the associated equipment that make up the large network wherein calls are routed and managed

Switch: equipment used to interconnect telephone lines and trunks, can be implemented at central office locations and larger private locations

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Core Wireless Terms

Mobile Telephone Switching Office: similar to the landline central office, except located near a wireless tower; the first stop a wireless call makes when being routed

Cell: basic geographic service area of a wireless communications system; created by the use of a low power wireless transmitter; often deployed in a grid fashion forming a honeycomb shape

Roaming: when a mobile telephone user leaves the local geographic area defined by their carrier, the user is said to roaming and a higher fee schedule is usually applied; roaming areas vary greatly according to the agreement between the user and carrier; can also refer to the use of another carrier's service

Computer Telephony Terms

Computer telephony integration (CTI): the application of computer intelligence to the making and receiving of phone calls, fax communications, and other complex messaging

Voice recognition: the ability to recognize spoken words with a computer application; can be likened to dictation in that the computer recognizes the spoken word but does not understand what is being said; typically users must speak slowly and distinctly for system to recognize all words

Text to speech (TTS): the process by which a computer converts any readable text into human sounding speech output; compelling for 511 use when used in concert with an interactive voice response system or voice portal; TTS can be either in digitized form (computer-sounding voice) or in concatenated form (phrases pre-recorded with human voice)

Interactive voice response (IVR): a software application that runs in conjunction with computer telephony hardware to capture touchtone telephone keypad inputs or spoken commands; the keypad inputs or spoken commands are typically used to make menu selections, answer yes/no questions, or to spell out certain words or names; allows the user to self-navigate systems without operator assistance; sometimes viewed as cumbersome by some users

Voice portal: a voice-activated Internet or information portal built on voice recognition and text-to-speech technologies; users call up interactive voice menus and forms through a telephone or a properly equipped computer; content accessed in this manner can be traditional web pages converted to sound files or customized information created by the voice portal vendor; call 1-800-555-TELL or 1-800-4B-VOCAL for good examples – some traffic information is available on each

Voice over Internet protocol (VoIP): a protocol that allows voice to be transmitted over a channel traditionally used for data; allows for consolidation of resources and saves money in many cases; VoIP enables cheaper routing/switching of voice communications than traditional equipment

Voice Extensible Markup Language (VXML): An Internet standard that defines voice segments and enables access to the Internet and other voice-activated devices

Scan of Existing Telephone Traveler Information Systems
Interim Report

Introduction

Telephone systems that provide information to travelers can be classified into four categories:

- *Roadway Condition/Construction Information Systems:* These systems generally cover a whole state or a region. They provide construction/maintenance information and/or weather-related roadway conditions. Some systems also provide information about major events and accidents that have regional impacts and/or result in road closures.
- *Transit Information Systems:* These systems provide fixed route and/or paratransit information. Provided information includes fare, schedule, trip planning, detours, and in some cases bus delays or current bus location.
- *Traffic/Multi-modal Information Systems:* These systems provide real-time route specific traffic information such as incidents, congestion limits, travel time, and diversion routes. Some systems also provide multi-modal information such as bus, paratransit, ferry, rail, airplane, and bicycles information. Other provided information includes parking, ridesharing, and telecommuting.
- *Private Sector Audio Portals:* With these systems, a user can call a toll free number and use a spoken command to get information and connect with a variety of services including traffic, travel direction, tourist information, taxi, business, news, weather, sport, entertainment, lottery, and others.

Weather-related roadway conditions, incidents, travel time, vehicle delay, transit delay and transit vehicle locations are dynamic information and are updated in real-time as conditions warranted. Construction information, transit route, transit fare, transit schedule and airplane/rail schedules are generally static, although, they can be updated as required.

This paper provides a review of existing telephone-based traveler information systems in the U.S. The paper is not a comprehensive survey of all such systems. Rather, its objective is to gain a better understanding of the implementations and operations of systems that represent each of the above four categories. ***This survey is a work in progress and this paper should be considered as an interim paper of the study.***

Survey Methodology

Systems representing each of the four categories, listed in the previous section, have been studied based on the followings:

- Telephone calls have been made to the systems to identify the information provided by the systems and the types of the user interface of the systems.
- Telephone calls have been made to system operators or operating agency representatives to ask questions regarding the implementations and operations of the systems. The telephone systems that are included in this study are the ones that we were able to interview their operators or agency representatives.
- A review of the literature has been made to collect information from previous studies that evaluated the systems that are considered in this study.

Tables 1 to 4 present the results obtained so far in the study.

Table 1 - Summary of Road Condition Information Telephone Survey

System	Number	Date Initiated	Operation Time	Area Covered	Interface	Operating Agencies	Usage (calls)	No. of Lines	Funding	User Fees	Information Provided	Information Source	Lessons Learned
California	1-800 427-Road	1964	24 hrs 7 days a week	California (statewide) state highways	Touchtone menu. Recorded messages per route.	Caltrans	2.6 million calls/yr. 4.7 million request for information	404	State	Cell time. Toll free in CA.	Construction, major incidents (road closure), weather related road conditions.	TMCs and Caltrans dispatchers. Information updated as needed.	Do not use deep menu. Get callers in and out quickly to reduce toll charges.
Florida DOT District 2	1-800 475-0044	1996	24 hrs 7 days a week	Northern Florida (17 Counties)	Touchtone menu. Messages per route.	Florida DOT D2 (operated by their consultant.)	10-15 calls per day	-	State	Cell charges.	Construction.	FDOT D2 fax information to consultant.	-
Montana	1-800 226-Road	Mid 1980's	24 hrs 7 days a week	Montana Interstates and major highways (statewide).	Touchtone menu. Recorded messages per region.	Montana DOT	40,000 to 50,000 for peak month.	32 (Also 32 can be queued)	State and federal	Cell charges are dropped by 3 carriers.	Construction and weather related road conditions.	District maintenance sections input data into ORACLE database. Forwarded to center.	Electronic sharing of information has been very effective.
Arkansas	1-800-245-1672	20 years ago	24 hrs 7 days a week	All Arkansas state highways	One recorded message for the state.	Arkansas State Highway Transportation Department	400 per normal month. In a 10 day storm, 50,000 calls.	6	State	Cell time.	Weather related road conditions.	Maintenance offices by telephone or radio. Information updated every hour in storm.	IVR would improve operation. Web-enabled telephone would save agency toll charges.
Nevada	1-877-NVRoads	-	24 hrs 7 days a week	Nevada Interstates and state highways.	Touchtone menu. Messages per route.	Nevada DOT	8,000 during a storm weekend in Reno.	41	State	Cell time.	Construction and weather related road conditions.	Districts enter data in ORACLE database. In storm, updates each hr.	IVR technology effective. Need to eliminate area-wide messages.
Pennsylvania Turnpike	1-800 331-3414	12 years ago	24 hrs 7 days a week	Pennsylvania Turnpike	Touchtone menu. Recorded messages per section.	Pennsylvania Turnpike	-	8	Turnpike Authority	Cell time.	Weather related road conditions, major accidents, construction.	Calls to/from dispatch centers (police, towing) and maintenance offices.	-
Virginia	1-800 367-Road	7 years ago	24 hrs 7 days a week	Virginia Interstates and primary roads	Touchtone menu. Recorded messages per route.	Virginia DOT	1,000 weekly on average. Increased in bad weather.	76	State	Cell time.	Weather related road conditions, major accidents, construction.	Law enforcement, DOT field personnel. Radio, telephone, fax, and computer are used.	Train field personnel to provide information.
Ohio DOT District 12	216-581 2333	4 years ago	24 hrs 7 days a week	Ohio District 12 major highways	Touchtone menu. Messages per region.	Ohio DOT District 12.	10 calls per day	-	State	Cell time and Long distance charged	Construction and maintenance information.	Maintenance yards compile lane closures daily and fax information	Diversion plans needed. Currently, Low public interest.
Arizona	1-888-411-Road	1992	24 hours 7 days a week	Statewide (and some adjacent states) highways and local Streets	Touchtone menu. Recorded messages per route.	Arizona DOT TMC share information with 89 Agencies.	5k to 10k calls/month (19 k in March 2000)	24	State	Cell time.	Construction, weather related conditions, and accidents conditions.	Authorized agencies enter information forwarded to the center.	Multi Agency coordination Understand system capabilities. Understand prices.
Chicago	1-800 452-4368	1989	24 hrs 7 days a week	Illinois Interstates	Touchtone menu. Recorded messages per route.	Illinois DOT	10,000 calls per hour in winter storm	40	State	Cell time.	Construction and weather related road conditions.	Maintenance personnel report problems to their office or center. 2-4 hr updates in storm.	In bad weather, system overloads. 511 publicity might overload the system.
Kentucky	1-800 4KY-Road	Mid 1990's	24 hrs 7 days a week	Kentucky interstates and major highways	Touchtone. Messages per route.	Private company under contract to KYTC	150-200 normal day. 12K in snow events.	22	State	Cell time.	Construction and weather related road conditions.	Districts enter data in a computer program. Data Forwarded to center.	Preformatted messages and simplified data entry should be used.

Note: DOT= Department of Transportation, KYTC= Kentucky Transportation Cabinet.

Table 2 - Summary of the Transit Information Telephone Survey

System	Number	Date Initiated	Operation Time	Area Covered	Interface	Operating Agency	Usage	Number of Lines	Funding	User Fees	Information Provided	Information Source	Lessons Learned
Houston, Texas	713-635-4000	20 years ago	6 AM - 9 PM weekdays. 8 AM -8 PM weekends. 24 hours automatic.	Harris County	Operator + touchtone menu with automated messages (English / Spanish).	Houston Metro.	1.8 million per year.	38 operator lines. 48 lines for automated.	FTA plus county funds.	Cellular fee plus long distance	Static. Delay if requested.	Operator uses hard copy of schedules. Delay from Transtar web site and dispatchers.	Qualified staff shortage. Need data fusion software. Simple menu/short cuts.
Broward County, Florida	934-357-8400	20 years ago	7 AM - 10 PM weekdays 7 AM - 8:30 PM Sat. 8:30 AM - 5 PM Sun	Broward County	Live operator (Spanish if on duty).	Broward County Mass Transit	1,300 per weekday.	16 lines	County	Cellular fee plus long distance	Static. Delay if requested.	Hardcopy for schedule. Delay from dispatchers.	Needs for regional information. Interagency corporation and timely delay detour information.
King County, Washington	206-553-3000	20-30 years ago	24 hrs/day automatic. 18 hrs/day operators.	King County (Seattle area).	Operator + touchtone menu with automated messages (AT&T translators).	King County Metro Transit	1 million per year.	-	County + contracts w other agencies.	Cellular fee plus long distance	Static. Delay if requested.	AVL data accessed by supervisor. Schedule read from computer.	Paperless environment. Real-time information. Automation of some functions. TTY has been useful. AT&T foreign language translation has been useful.
Lexington, Kentucky	859-253-4636	1996	6 AM-10 PM weekdays. 10 AM - 6 PM weekends.	Fayette County	Live operator.	Lextran	32 calls per hr.	5 lines	County	Cellular fee plus long distance	Static.	Operator reads schedule from hard copy	Software/system should be selected carefully. Software failure caused problems.
Jacksonville, Florida	904-630-3100	7 years ago	6 AM -7 PM weekdays. 8:30 AM-4:30 PM weekends.	Jacksonville	Live operator.	Jacksonville Transportation Authority	4,000 calls per week.	9 lines	City Federal, state.	Cellular fee plus long distance.	Static. Delay if requested.	Schedule is read from computer. Delay from dispatchers.	Needs for real-time information.
Southern Pennsylvania	215-580-7800	35 years ago	6 AM - 8 PM. 24 hours automatic.	Philadelphia and surrounding areas	Operator plus touchtone menu with automated messages (Spanish for automated messages).	Southern Pennsylvania Transportation Authority (SEPTA)	2 million/yr for operator. 1 million/yr for automatic.	27 operator lines. 32 lines for automated.	SEPTA	Cellular fee plus long distance	Static. Delay if requested. Connection to SmartTraveler.	Schedule is read from computer. Delay from dispatchers.	
Milwaukee, Wisconsin	414-344-6711	20 years ago	weekdays: 5 AM to 10 PM. Weekends: 6 AM to 6 PM. 24 hours automatic.	Milwaukee County	Operator plus touchtone menu with automated messages.	Milwaukee Transport Services	2000 per day.		County funds	Cellular fee plus long distance	Static. Delay if requested.	Schedule is read from computer. Delay from dispatchers.	Real time bus detour/delay information needed. Qualified live operators are needed.
Stamford, Connecticut	203-327-7433	25 years ago	7 a.m. to 7 p.m.	6 towns (Stamford area)	Live Operator	CT Transit	500 calls per day.	9 lines.	CT Transit (state agency)	Cellular fee plus long distance	Static. Delay if requested.	Operator uses hard copy of schedules. Delay from dispatchers	Real time information is important. Automatic messages useful for certain inquiry to save operator time.
Denver, Colorado	303-299-6000 800-366-7433	25 years ago	6 a.m. to 8 p.m. weekdays. 8 a.m. to 8 p.m. weekends.	Denver Metropolitan Area	Live operator (English/ Spanish).	Regional Transportation District	4100 calls per day/up to 6000 calls.	-	Federal and state	Cellular fee	Static. Bus location if requested.	Schedule is read from computer. AVL data accessed by supervisor.	Intensive operator training is important.
Topeka, Kansas	785-354-9571	Long time ago.	6 a.m. to 6 p.m.	Topeka	Live operator	Topeka Metropolitan Transit Authority	Normally low, <100 per day. Much higher in special events.	2 lines.	Transit Authority	Cellular fee plus long distance	Static. Delay if requested.	Operator uses hard copy of schedules. Delay from dispatchers.	Operator must be friendly and accessible.

Table 3 - Summary of Traffic/Multi-Model Information Telephone Survey

System	Number	Date Initiated	Operation Time	Area Covered	Interface	Involved Agencies	Usage	Number of lines	Funding	User Fees	Information Provided	Information Source	Lessons Learned
California	1-800-commute	1994 (during LA earthquake response)	24 hours a day 7 days a week	Northern CA, Southern CA, San Diego.	Touchtone. English & Spanish.	Caltrans (agreements with other transp. agencies)	3 Millions per year	North CA = 4 South CA = 48 San Diego=10	Caltrans	Cell time. Toll free is statewide.	Connects calls to transit, rail, ridesharing, and telecommuting agencies.	No direct information provided. System reroute calls to others.	High user satisfaction. Users want multi-modal info. and all mode information in one call.
Branson, Missouri	1-877-4tripinfo	1997	24 hours a day 7 days a week	Major roads in Branson area.	Touchtone menu.	Missouri DOT, City of Branson, Police, and 911.	4-10 calls per day	4	Missouri DOT and City of Branson.	Cell time. Toll free is regional.	Incidents, special events, major construction, alternative routes.	Data collected from sensors, cameras, police, construction and weather agencies. Data entered in a computer at 911 center.	Low awareness of system. High satisfaction.
Rhode Island	1-800-354-9595	One year ago	6 AM to 10 PM weekday	Rhode Island Interstates	Manual (Operator at TMC).	Rhode Island DOT.	4 calls per day	2	Rhode Island DOT	Cell time plus long dist.	Incidents, emergency, and construction information.	TMC software, police and traveler calls.	
Orange County, California.	949-451-1847	Currently in Beta testing	Agencies enter info. as needed. Operators work in peak periods.	Orange County, CA	Touchtone menu\ messages per route.	Caltrans, Orange County, FHWA and cities. Connections to transit agencies.	Beta testing	22 (will be expanded)	FHWA, Caltrans, and Orange County.	Cell time plus long distance.	Congestion info., TT by route, direct connection to transit agencies, construction.	34 Agencies in the county can enter data.	Be sure of the capability of selected technology. Make system intuitive. Avoid 3 level deep menus.
Travinfo, California	817-1717 817-1718 (TTY) (6 Area Codes)	1996	24 hours a day 7 days a week	9 Counties in San Francisco Bay area	Touchtone menu\ recorded messages per route.	Metropolitan Transportation Commission, Caltrans, CHP, and cellular companies.	70,000 calls per month	154	Mixture, mainly CMAQ.	Cell time plus long distance.	Weather, incidents, diversion (in case of closure), major transit delays. Provide connections to transit agencies.	Caltrans cameras, detectors, cell phone reporters, CHP, maintenance, other agencies through operator calls.	Simplify menu. Automate Data entry. Incorporate transit info. Users are satisfied. Needs interjurisdictional trip plans, better data quality/timeliness. and public awareness activities.
Minneapolis / St. Paul, Minnesota	651-633-8383	1998	5:30 AM to 7:30:00 PM WD. Non real-time: 24 hours\ 7 days a week	Freeways and Major roads in 11 Counties in Minneapolis area.	Touchtone menu\ recorded messages per route.	Operated by Smart-Route for the Minnesota DOT	4,000 to 6,000 per day (triple during storms)	96	Public fund, Web advertisement and info. resell.	Cell time charges dropped. Long dist. charged.	Incidents, TT diversion, transit delays, airport, parking, weather, road conditions. Transit agency connections.	Loops, aircraft, CCTV, reporters, police/fire communication, transit, construction. Bidirec - tionals calls and faxes.	Public vs. private sector expectations. Required skills. Scrutiny from media/public. Evaluation show the provided information is accurate.
Boston, MA	617-374-1234	1993	5:00 AM to 9:00:00 PM WD. 10:00 AM to 7:00:00 PM WE. Non real-time: 24 hrs all week.	Interstates and Major roads in Boston.	Touchtone menu\ recorded messages per route.	Operated by Smart-Route for the Massachusetts Highway Department	12k to 15k per day. 40 k busy days.	Can receive 7,000 calls /hr	Public fund, Web advertisement and info. resell.	Cell time charges dropped. Long dist. charged.	Incidents, TT, diversion routes, transit updates & delays, airport, parking, car share, road conditions water shuttle. Connection to transit.	CCTV, mobile reporters, police, fire communication, transit agency, port authority, construction. Bidirec - tionals calls and faxes.	Use private sector experience. Marketing & cellular time charge elimination increases use. Dealing with carriers is difficult. Callers are satisfied.
Chicago Illinois	847-705-4620	Automated System is New	24 hours 7 days of the week	Chicago Expressways.	Touchtone menu\ recorded messages per route.	Illinois Department of Transportation TRW, SmartRoute.	Few calls mostly from media	1	State fund	Cell time and long distance.	TT, incidents congestion limits, links to road s phone list for transit agencies.	Detectors information from TMC, service patrol and police. Enter information into computer.	Good relation necessary with media. Public agencies do not always need private sector to develop these systems.
Cincinnati OH and Northern Kentucky	211 or (513) 333-3333	1995	6:00 AM to 7:00:00 PM WD Non real-time: 24 hrs all week	Major roads in the area.	Touchtone menu\ recorded messages per route.	Kentucky Transp. Cabinet, Ohio DOT, FHWA, OKI-Council of Government, City of Cincinnati.	50k to 100k calls per month	96	Public fund, Web advertisement and info. resell.	Cell time charges dropped. Long dist. charged.	TT, incidents, speed limits, incident durations, alternative routes, congestion limits, transit delays. Connect to transit.	Detectors, mobile reporters, const., fire and police dispatchers, weather. Two-way communication with police and transit.	Good/experienced staff important. Users are satisfied. Expand traffic information coverage. Institutional issues should be resolved up front. Should set Policy and procedures.

Note: TT=travel time, WD = weekday, WE = weekend, CHP = California Highway Patrol, TMC = traffic management center, CMAQ = The Congestion Mitigation and Air Quality Program, DOT = Department of Transportation, FHWA = Federal Highway Administratic

Table 4 - Summary of the Private Audio Portals Survey

System	*Number*	*Date Initiated*	*Operation Time*	*Area Covered*	*Interface*	*Traffic Information*	*Information Source*	*Other Information Provided*	*Funding*	*User Fees*
Tellme	1-800-555-TELL	1999	7 days a week/ 24 hours a day.	Traffic for 65 cities in the U.S. (Other information available in all of U.S.)	English speech recognition and voice synthesis IVR. Route specific information. Interface & favorite routes can be set. Location of call automatically identified.	incidents, construction location and estimated duration.	Etak\metro	Driving directions, travel, taxi, lotto, soap, movies, horoscopes, weather, news, stock, sports, restaurants.	Investment by capital firms and investors. Revenues are generated from promotions and building/deploying voice applications	Toll free in the US. Cell time charges apply.
BeVocal	1-800-4-bevocal	1999	7 days a week/ 24 hours a day.	Traffic for 65 cities in the U.S. (Other information available in all of U.S.)	English speech recognition and voice synthesis IVR. Route specific information. Interface & favorite routes can be set. Location of call automatically identified. WAP, fax, email, text paging.	incidents, construction location and estimated duration.	Etak\metro	Driving directions, weather, news, business, sports, horoscopes, lotto, Soap opera, flight information.	Investment by capital firms and investors. Revenues are generated from parties that use BeVocal applications. Outsource service or license software (e.g., Quest Wireless).	Toll free in the US. Cell time charges apply.
AudioPoint	1-888-38-Audio	1999	7 days a week/ 24 hours a day.	Traffic for 20 cities in the US. (Other information available for all US.)	English speech recognition and voice synthesis IVR. Customized AM and PM routes. Recorded messages for all incidents in the city.	Incident locations.	SmartRoute	business, sports, horoscopes, news updates, weather entertainment.	AudioPoint is advertiser supported. The advertisements are 5 to 10 seconds in length and will be heard every 45 seconds.	Toll free in the US. Cell time charges apply.
AOL Phone										

511 Case Study Overview – The State of Arizona

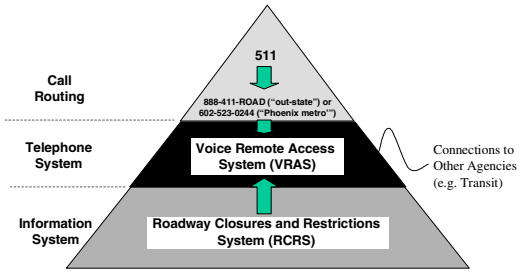
Five government sponsored phone-based traveler information systems have been identified to be operating in Arizona. The 888-411-ROAD toll-free phone system, Voice Remote Access System (VRAS), operated by Arizona DOT (ADOT) is the most relevant in terms of near-term 511 services. The VRAS is an automated interactive voice response (IVR) system that handled over 100,000 phone calls in 2000, more than a 100% increase from 1999. The VRAS often becomes overloaded with demand during inclement weather or holiday weekends.

The Roadway Closures and Restrictions System (RCRS) provides this information to the VRAS. The RCRS collects information about construction locations, traffic-related maintenance activities, weather-related road closures, and traffic incidents from various authorized agencies for both local arterial streets and urban/rural highways statewide. Presently, data is inserted from 89 locations ranging from ADOT Districts, several cities, the Highway Patrol, National Forest and Weather Services, Grand Canyon National Park as well as neighboring states. The RCRS software is available to other public agencies through a free license from Arizona DOT.

511 Vision

At least in the near-to-mid-term, Arizona DOT will continue to operate the VRAS as the gateway to traveler information in the state. The service will continue to be free to callers. Key elements of the Vision of the Arizona 511 approach are:

– Reprogram switches to point 511 calls to the VRAS
– Expand system capacity to meet anticipated demand
– Include a call forwarding option to reach the appropriate transit agency and where available, dial-a-ride services
– Deploy roadside signage to "advertise" 511



Ongoing Activities

An Arizona 511 Task Force has been established to coordinate the conversion of existing phone systems to 511 and facilitate their functional expansion. The Task Force identified several key issues and steps needed to roll out 511 services, with an initial focus on wireline calls. However, Qwest, the largest wireline carrier, has not been as responsive as hoped to work out the necessary technical and financial agreements to enable call routing.

Lessons Learned

– Task Forces for multi-agency coordination work
– If procuring IVR system, direct communications with vendor's technical resources strongly encouraged
– Carefully understand system pricing
– Standards or guidelines for menu tree design would be helpful
– Standards or guidelines for roadside signage would be helpful
– Don't be afraid to ask for technical assistance from the regulatory commission

For full report, go to: http://www.its.dot.gov/511/Arizona.pdf

March 1, 2001

511 Case Study Overview – The Commonwealth of Kentucky

Ten transportation-related phone information systems have been identified to be operating in the Kentucky. Two of these systems are most relevant in terms of near-term plans for 511 conversion:

- ARTIMIS TATS – In conjunction with the Ohio Department of Transportation, the Kentucky Transportation Cabinet (KYTC) has implemented the ARTIMIS Traffic Advisory Telephone Service (TATS) in the Cincinnati/Northern Kentucky metropolitan area which provides real-time, route specific multi-modal traveler information. Since May 1998, 211 has been used as the access number area-wide and call volume averages 70,000-80,000 calls per month (211 locally, 513/333-3333 everywhere). The ARTIMIS TATS has shown that a three digit number generates 73% more calls than a seven digit number.
- Kentucky Road Report – Kentucky operates a statewide system, including a toll-free phone number, that provides daily updates, Monday-Friday, focused on providing construction, weather and major event-related information on interstates and parkways (1-800-4KY-ROAD).

511 Vision

When completed, the Commonwealth envisions ***four regional 511 services overlaid on a statewide system***. Plans call for services such as those offered in Northern Kentucky to be available in the Louisville and Lexington metropolitan areas and the Cumberland Gap region of Southeast Kentucky. Each of those systems would offer connectivity to the Statewide Road Report that would be the default system in all other areas of the state. It is also envisioned that callers to the Road Report could be routed to any of the four regional areas at their option. The system routed to would depend upon callers location. KYTC plans to continue the service as a free call to users for the foreseeable future.

Ongoing Activities

Two key activities are Number assignment and routing conversion:

- Number assignment – On October 30, 2000, the Kentucky Public Service Commission assigned the 511 dialing code to the KYTC on a permanent, statewide basis.
- Routing conversion – KYTC is presently negotiating with major wireline carriers on the cost of providing the service. Other wireline carriers will follow. In the near-term, will convert existing wireless services to 511. Other wireless carriers will follow.

Lessons Learned

- Find and contact your state telephone association
- Make early, informal contact with the public utilities or service commission
- Most of the cost is to gather and format the information provided, not the cost of calls
- Consider human factors when designing the telephone system

For full report, go to: http://www.its.dot.gov/511/Kentucky.pdf

511 Case Study Overview – Greater Detroit Region

At least thirteen traffic, transit, and transportation-information telephone systems are currently in operation in the southeastern Michigan / Windsor, Ontario region. The focus of this case study was specifically on the three county area - Wayne, Oakland, and Macomb – which is a subset of the region's seven county Southeast Michigan Council of Governments (SEMCOG).

Michigan DOT's MITS Center is the clearinghouse for real-time freeway information for greater Detroit and the real-time ITS and incident information collected at the MITS Center is the most pertinent for a near term 511 phone system when initiated in Southeastern Michigan. MDOT's only existing statewide phone system provides construction information for the state highway system by dialing toll free 800-641-MDOT.

511 Vision

The Michigan Department of Transportation has identified that the successful implementation of 511 statewide requires a consolidation of all currently operating traveler information telephone numbers under a single point of contact. It is envisioned that Michigan's future statewide 511 system would be anchored by two regional 511 service areas – Detroit/SEMCOG and Grand Rapids - overlaid by a statewide default system (possibly an enhanced version of the existing statewide construction hotline) in all other areas of Michigan. The granularity of the rural area information should not be expected to be the same as within the Detroit and Grand Rapids areas. The greater Detroit area 511 should include southern Ontario in its watershed.

Ongoing Activities

MDOT has decided to do a one-year 511 pilot program before accepting competitive bids. It is anticipated that the pilot program would begin in the greater Detroit area and possibly cover the entire seven-county SEMCOG region.

- Kick-off Session – Ameritech (the major ILEC for Michigan) and MDOT will host a meeting of all appropriate agencies to discuss all of the major 511 implementation issues.
- Implementation Plan – MDOT will develop an action plan and Ameritech will file a tariff with the MPSC for 511; all other LECs and the wireless carriers would need to decide on filing own tariffs to connect to main service (Ameritech).

Lessons Learned

- Lead implementing agency must consider all available public transportation providers
- Service across both state lines and international borders must be ensured
- Strong public awareness and marketing campaigns should accompany 511 implementation
- Private sector transportation providers should be consulted throughout all phases of deployment

As this case study is under development, the full report is not yet available.

511 Case Study Overview – The State of Minnesota

Of the many transportation and tourism related phone information systems currently operating in Minnesota, two have been identified as most relevant in terms of near-term plans for 511 conversion:

- Winter and Summer Road and Weather Conditions: The Minnesota Department of Transportation (Mn/DOT) through the Office of Maintenance has implemented a statewide toll-free and a local Twin Cities number to access road conditions. These numbers are 1-800-542-0220 and 651-284-0511. The telephony equipment was recently upgraded from 19 incoming lines to 47 to reduce the number of missed calls. In March 2001 the system was upgraded from human operator voice-recorded information to a system that coverts text to speech through concatenation of prerecorded words and phrases.
- Minnesota Condition Acquisition and Reporting System (Mn/CARS): Through a pooled-fund project with Iowa, Washington and Missouri, Minnesota has developed and implemented Mn/CARS. Mn/CARS is an Internet-based application used by Mn/DOT Districts and the Minnesota State Patrol to enter data about road conditions, restrictions and incidents. Mn/CARS data is integrated into a database that is then accessible to travelers though the Winter and Summer Road and Weather Conditions numbers.
- Road and Weather Information System (R/WIS): Mn/DOT has implemented a statewide system of R/WIS sensors to collect real-time road surface and weather conditions. This system is then used to provide real-time road-related weather reports and forecasts. The current weather reports and near-term forecasts are then integrated into a database that is accessible to travelers through the Winter and Summer Road and Weather Conditions numbers.

511 Vision

The short-term vision for 511 in Minnesota is to provide statewide cellular access to the Winter and Summer Road and Weather Conditions information system. The long-term vision is still being developed. The final long-term vision will include input from tourism, transit, freight, parking and other transportation information stakeholders. The long-term vision will also explore the appropriate public and private roles to assure long-term sustainability and quality of service.

Ongoing Activities

- Mn/DOT has created executive and technical groups to manage 511 implementation.
- Mn/DOT is informally contacting cellular providers for purposes of enabling 511.
- Mn/DOT is coordinating with other N11 stakeholders (211, 711 and 911).
- A workshop is planned for mid-2001 to get stakeholder input to an overall Minnesota vision and deployment plan for 511.
- An evaluation of the Winter and Summer Road and Weather Condition system from a traveler perspective is planned for the spring of 2001. The evaluation will look at both information content and menus used to access the information.

For Further Information

- http://www.dot.state.mn.us/guidestar/511proj.html

511 Case Studies Overview -- San Francisco Bay Area

Since 1996, the San Francisco Bay Area Metropolitan Transportation Commission (MTC) has operated TravInfo® as a comprehensive system to gather, organize and disseminate timely information on San Francisco Bay Area traffic and road conditions, public transit routes and schedules, carpooling, highway construction and road closures, van and taxi services for disabled travelers, park-and-ride facilities, and bicycle programs. The project's day-to-day management team operates with policy direction from the Freeway Management Program Executive Committee (MTC, Caltrans District 4, and the Golden Gate Division of the California Highway Patrol (CHP)). The historical focus of TravInfo®'s data dissemination has been the Traveler Advisory Telephone System (TATS). Callers anywhere in the Bay Area can reach the TATS by dialing the same seven-digit number, 817-1717, without the need to dial an area code (there are presently six area codes in the area). Call volumes average 65,000 per month, with 70% of the calls routed to transit agencies. The service is free to callers, though local toll charges may apply.

511 Vision

At the earliest practical time, TravInfo® will be accessible via 511 in the present nine county area served by 817-1717 today. Further, as a means to provide information to those coming to but not yet in the Bay Area, MTC will be exploring ways callers outside the area will be able to access the same information (e.g., via a 1-800 toll-free number). Concurrently, MTC is upgrading its entire traveler information system to improve the quality, accuracy and timeliness of available information and increase the number of road miles of coverage. Thus, the 511 service will be supported by higher quality information over a greater geographic coverage area.

Ongoing Activities

Four key activities are:

- Call Routing: MTC is working with SBC/Pacific Bell, the dominant landline carrier to determine the most cost-effective and fairest method, technically and contractually, to route calls via 511. Additionally, MTC is determining the most efficient Interactive Voice Response system architecture to cost-effectively serve the nine-county, six area code region.
- Information Enhancements: Upgrades in data collection, data fusion, agency coordination and information dissemination will be occurring between now and Summer 2002.
- Marketing: Significant resources (over $1M annually) has been allocated in the coming years to market TravInfo®, with the principal focus of the marketing being the phone service.
- Statewide Coordination: MTC is working closely with Caltrans and other regions in California to facilitate an orderly, coordinated deployment of 511 throughout the state.

Lessons Learned

- For a regional agency seeking to implement 511 access promptly, it is helpful to find a state agency to support the regional agency's intentions.
- Key steps along the critical path for 511 access are to gain a commitment of resources by local telecommunications carriers and to have them develop appropriate service offerings.
- Substantial marketing is required to create awareness and usage of the service.

As this case study is under development, the full report is not yet available.

511 Case Study Overview – The State of Utah

A minimum of twelve transportation-related phone information systems have been identified to be operating in the state of Utah. Currently, the most relevant in terms of 511 service is the Utah Department of Transportation's (UDOT's) 1-800-492-2400 Winter Road Conditions Hotline which is updated by the maintenance workers at a minimum daily, or as conditions change. This system is currently being upgraded to include much more as detailed below.

511 Vision

Utah is in the process of developing a new Traveler Advisory Telephone system which will integrate the road weather conditions, crashes, congestion, and construction activities into this system. This system will also route calls to the transit and other agencies which provide other types of traveler information which could possibly include National Park Information for the numerous parks located in the southern part of the state. It is also envisioned that traveler information specific to the Olympic activities, such as parking information, will be provided during the 2002 Winter Olympic Games in Salt Lake City.

Utah is also currently developing an Event Tracking System which will allow state and city construction, maintenance and permits workers to enter information about their projects and update the status and impacts of the projects from the field via keyed input from a telephone. This system will be used to provide information to our website and the Traveler Advisory Telephone system.

Ongoing Activities

In addition to the development of the new Traveler Advisory Telephone system, UDOT is currently seeking legislation which will designate UDOT as the lead agency for 511 deployment in the state. Qwest, the largest wireline carrier, is in the process of developing switching software to handle the 511 calls. Their cost information should be available in March and 511 service should be available through them this summer.

We will be using Georgia Tech's Human Factors expertise to aid us in designing the new Traveler Advisory Telephone system interface in order to make the system as efficient and user friendly as possible. An Advisory Committee with core stakeholders including the Utah Transit Authority, core cities including Salt Lake, Ogden, and Provo, and others will be used to help in developing the system.

Lessons Learned

Being the last of the early adopter states, we have benefited much from the experienced learned from Kentucky and Arizona, and by participating in the national 511 Working Group Committee.

National 511 Deployment Assistance and Coordination Program Working Group

Membership List

Jim Wright, Chair
ITS Engineer
AASHTO/MnDOT
1500 West County Road B2
Room 121
Roseville, MN 55113
PH: 651-582-1349 FAX: 651-582-1302
Jim.wright@dot.state.mn.us

Pierre Pretorius, P.E., Vice Chair
Kimley-Horn and Associates, Inc.
7600 North 15th Street
Suite 250
Phoenix, AZ 85020
PH: 602-944-5500 FAX: 602-944-7423
Ppretorius@phx.kimley-horn.com

W. Mark Adams
Executive Director
National Emergency Number Association
POB 360960
Columbus, Ohio 43236
PH: 800-332-3911 FAX: 614-933-0911
mark@nena9-1-1.org

Bruce Ahern
Assistant General Manager
Port Authority of Allegheny County
2235 Beaver Avenue
Pittsburgh, PA 15233-1080
PH: 412-566-5104 FAX: 412-237-6438
Bahern@portauthority.org

Patty Babal
Navigation Technologies
11211Waples Mill Road, Suite 210
Fairfax, VA 22030
PH: 703-359-0312
Babal@navtech.com

Susan K. Beaty
Sr. Project Manager
Houston Transtar
Metropolitan Transit Authority
6922 Old Katy Road
Houston, Texas 77024
PH: 713 881-3029 FAX: 713 881-3028
Pager: 281-268-7778
transtar.transtar.sbeaty@mailgw.dot.state.tx.us

Ron Boenau
Chief, Advanced Public Transportation Systems Division
Federal Transit Administration
400 Seventh Street, SW, TRI-11
Washington, DC 20590
PH: 202-366-0195 FAX: 202-366-3765
ronald.boenau@fta.dot.gov

Tom Bulger
President
Government Relations, Inc.
1050 17th St. NW, Suite 510
Washington, DC 20036
PH: 202-775-0079 FAX: 202-785-0477
Tbulger825@aol.com

Jeff Brummond
Senior Systems Architect
Iteris, Inc.
45472 Holiday Drive, Suite 8
Sterling, VA 20166-9457
PH: 703-925-3813 FAX: 703-471-1757
Jab@iteris.com

Bryan Chamberlain
ATIS Project Manager
Utah Department of Transportation
Box 141265
Salt Lake City, UT 84114-1265
PH: 801-965-4222 FAX: 801-965-4073

bchamber@dot.state.ut.us

Pete Costello
Director, Infrastructure and Operations
ITS America
400 Virginia Ave., S.W., Suite 800
Washington, D.C. 20024-2730
PH: 202-484-4668 FAX: 202-484-3483
pcostello@itsa.org

Melanie Crotty
Senior Planner
Metropolitan Transportation Commission
101 Eighth Street
Oakland, CA 94607-4700
PH: 510-817-3280 FAX: 510-817-3299
Mcrotty@mtc.ca.gov

Sandra Davenport
Senior Director of Customer Service and Transit Information
NJ TRANSIT
One Penn Plaza East
Newark, NJ 07105
PH: 973-491-7908 Fax: 973-491-7408
Sdavenport@njtransit.com

Steve Decker
Emergency Coordination Officer
Florida DOT
605 Suwannee St.
Tallahassee, FL
PH: 850-488-3546 FAX: 850-922-2935
steven.decker@dot.state.fl.us

Rick Dye
CHART System Administrator
Maryland State Highway Administration
7491 Connelley Drive
Hanover, MD 21076
PH: 410-582-5619 FAX: 410-582-9880
Rdye@sha.state.md.us

Dave Ekern
Assistant Commissioner
Minnesota DOT
395 John Ireland Blvd., MS 140
St. Paul, MN 55155
PH: 651-296-6884 FAX: 651-282-2656
Dave.ekern@dot.state.mn.us

David Fierro
V.P. Public Sector Business Development
SmartRoute Systems
10501 Mesa Lane
Clermont, FL 34711
PH (352) 241-0726
FAX (352) 241-2328
dfierro@smartroute.com

Bob Fogel (Dalen Harris)
National Association of Counties
440 1st Street, NW
Washington, DC
PH: 202-942-4236
Bfogel@naco.org
Dharris@naco.org

Tony Giancola
Executive Director
National Association of County Engineers
440 1st Street, NW
Washington, DC 20001
PH: 202-393-5041
Agiancol@naco.org

Kelly Hutchinson
ITS Operations Engineer
N.C. DOT
MSC 1533
Raleigh, NC 27699
PH: 919-233-9331 x230
FAX: 919-852-03480
khutchinson@dot.state.nc.us

Leslie Jacobson
Western Systems Manager
PB Farradyne Inc.
999 Third Ave.
Suite 2200
Seattle, WA 98104-4020
PH: 206-382-5290 FAX: 206-382-5222
Jacobsonl@pbworld.com

William Jones
Technical Director
U.S. DOT/FHWA
Room 3416
400 7th Street, SW
Washington, DC 20590
PH; 202-366-2128 FAX: 202-366-3302
William.s.jones@fhwa.dot.gov

Dennis Keck
Assistant Commissioner, Capital Program Management
New Jersey Department of Transportation
P.O. Box 600
1035 Parkway Avenue
Trenton, NJ 08625
PH: 609-530-5704 FAX: 609-530-2532
Dkeck@cpm.dot.state.nj.us

W. Todd Kell
Senior Policy Analyst
Intelligent Transportation Systems Div.
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219
Ph. 804-786-2451 Fx. 804-786-9748
kell_wt@vdot.state.va.us

Steve Kuciemba
Vice President, Technology
ITS America
400 Virginia Ave., S.W., Suite 800
Washington, D.C. 20024-2730
PH: 202-484-4847 FAX: 202-484-3483
Skuciemba@itsa.org

Patrick Liccardello
Program Manager
Lockheed Martin ITS
P.O. Box 179
Denver, CO 80201-0179
MS: DC 4350
PH: 303-971-9482
Patrick.licacardello@lmco.com

Mac Lister
FHWA
19900 Governors Dr. Suite 301
Olympia Fields, IL 60461
PH: 708-283-3532 FAX: 708-283-3501
Mac.lister@fhwa.dot.gov

Duana Love
Chicago RTA
Program Manager Engineering & Technology
Regional Transportation Authority (RTA
181 W. Madison, Suite 1900
Chicago, IL 60602
PH: 312-917-1563
LoveD@RTACHICAGO.RTA.com

Mike Nevarez
Phoenix Transit
Transit Operations Manager
302 N. First Avenue
Suite 700
Phoenix, AZ 85003
PH: 602-262-7303
mnevarez@vm.maricopa.gov

Janet Oakley
Government Relations Director
AASHTO
Suite 249
444 North Capitol Street, NW
Washington, DC 20001
PH: 202-624-3698 FAX: 202-624-xxxx
Joakley@aashto.org

Jeff Paniati
ITS Program Manager
U.S. DOT
ITS Joint Program Office
400 7th Street, SW
Washington, DC 20590
PH: 202-366-9536 FAX: 202-366-3302
Jeff.paniati@fhwa.dot.gov

Scott Perley
Associate
Traffic.com

851 Duportail Rd., Suite 220
Wayne, PA 19087
PH: 610-407-3416
sperley@traffic.com

James Pol
Transportation Specialist
FHWA
HOIT-1, Room 3416
400 7th Street, SW
Washington, DC 20590
PH; 202-366-4374 FAX: 202-493-2027
James.pol@fhwa.dot.gov

Kunwar Rajendra
Engineer of Intelligent Transportation Systems
Bureau of Transportation Planning
Michigan Department of Transportation
425 W. Ottawa St.
P.O.Box 30050
Lansing MI 48909
PH: 517-335-2893 FAX: 517-373-9255
rajendrak@state.mi.us

Craig Roberts
ITS Eastern Region Program Manager
PBS&J
620 Herndon Parkway, Suite 330
Herndon, VA 20170
PH: 703-471-7275 FAX: 703-471-8021
Craigroberts@pbsj.com

Raymond R. Ruggieri
Business Development
TRANSCOM
Newport Financial Center - 6th Floor
111 Pavonia Avenue
Jersey City, NJ 07310-1755
PH: 201.963.4033 FAX: 201.963.8376
ruggieri@xcm.org

Robert Rupert
Team Leader
FHWA
HOTM-1, Room 3404
400 7th Street, SW
Washington, DC 20590
PH; 202-366-2194 FAX: 202-366-8712
Robert.rupert@fhwa.dot.gov

Louis F. Sanders
APTA
1666 K Street, NW
Washington, DC 20006
PH: 202-496-4886 FAX:
Lsanders@apta.com

Rick Schuman
Mgr., Traveler Information Systems
PBS&J
482 S. Keller Road
Orlando, FL 32810
PH: 407-647-7275, ext. 142
FAX: 407-647-4281
rickschuman@pbsj.com

Eli Sherer
National Director, Operations Development
Traffic Station
375 Newtonville Ave, #2
Newton, MA 02460
PH: 617-916-5859 FAX: 603-994-9406
Eli@trafficstation.com

Mshadoni Smith
FHWA
980 Ninth Street, Suite 400
Sacramento, CA 95814
PH: 916-498-5732 FAX: 916-498-5008
Mshadoni.smith@fhwa.dot.gov

Kathy Stein
Principal
Howard Stein-Hudson Associates
38 Chuancy Street
Boston,MA 02111
PH: 617-482-7080 FAX: 617-482-7417
Kstein@hshassoc.com

Jerry Strigari
Director, Telecommunications
NJ Transit

One Penn Plaza East
Newark, NJ 07105
PH: 973-491-7194 FAX: 973-491-8889
Jstrigari@njtransit.com

R. Leon Walden, P.E.
ITS Team, Division of Operations
Kentucky Transportation Cabinet
State Office Builidng
Frankfort, KY 40622
PH: 502-564-4556 FAX: 502-564-6640
Lwalden@mail.kytc.state.ky.us

Alice Wiggins
Vice President of Marketing
MARTA
2424 Piedmont Road
Atlanta, GA 30324
PH: 404-848-5026 FAX: 404-848-5098
Awiggins@itsmarta.com

Timothy M. Wolfe, P.E.
Assistant State Engineer
Arizona Department of Transportation
Transportation Technology Group
2302 West Durango Street, Mail Drop
PM02
Phoenix, AZ 85009-6452
PH: 602-255-6622 FAX: 602-407-3394
Mobile: 602-370-6301
Twolfe@dot.state.az.us

Carol Zimmerman
Vice President, Transportation Systems
Battelle
901 D Street, SW, Suite 900
Washington, DC 20024-2115
PH: 202-646-7808 FAX: 202-646-5271
Zimmermc@battelle.org